

Application No.: 10/799,715

REMARKS

I. Introduction

In response to the pending Office Action, Applicants have amended claims 34 and 43 so as to overcome the § 112, first paragraph rejections cited in the July 7, 2005 Office Action. Claims 35, 38 and 39 have been cancelled. Support for the amendment to claims 34 and 43 may be found, for example, on page 28, line 18 to page 29, line 10 of the specification. No new matter has been added. For the reasons set forth below, Applicants respectfully submit that the pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 34-48 Under 35 U.S.C. § 102 Over Itoh

Claims 34-48 were rejected under 35 U.S.C. § 102(b) as being anticipated by Itoh et al. (U.S. 5,160,998). Applicants respectfully traverse these rejections for at least the following reasons. The rejection of claims 35, 38 and 39 is rendered moot as they have been cancelled.

The present invention relates to a semiconductor device comprising: a substrate having a semiconductor region; an insulating film formed over said semiconductor region, said insulating film including impurities and **having a property of reflowing due to a heat treatment under predetermined conditions**; an interconnection disposed on and in contact with a first region of an upper surface of said insulating film; a silicon oxide film in contact with a second region of said upper surface of said insulating film, said silicon oxide film having a property of not reflowing due to said heat treatment under said predetermined conditions. Claim 43 is similar to claim 34 except that it substitutes the term "phosphorus" in place of the term "impurities".

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The Examiner asserts that the compressive stress insulation layer 412 of Itoh is a BPSG film, the tensile stress insulation layer 421 is a SiO_2 film, and the compressive stress insulation layer 422 is a Si_3N_4 film. However, Itoh discloses that each of the compressive stress insulation layer 412 and the tensile stress insulation layer 421 is made of the insulation material such as PSG, SiO_2 , SiON, Si_3N_4 or BPSG (col. 4, lines 13-37). These insulation materials disclosed by Itoh do not all have a property of reflowing due to a heat treatment under predetermined conditions. Thus, Itoh does not disclose the foregoing element recited by claims 34 and 43 because not all of the disclosed materials will reflow due to heat treatment under predetermined conditions. Thus, Itoh does not anticipate claims 34 and 43 of the present invention. Moreover, Itoh discloses a silicon dioxide insulating layer 2 formed on the silicon substrate. This layer will not reflow during the heat treatment. In view of the foregoing, it is clear that the features of Itoh does not disclose an insulating film having a property of reflowing due to a heat treatment under predetermined conditions.

In addition, Itoh fails to disclose how to combine the insulation materials. Specifically, the insulation material of each of the compressive stress insulation layers 412 and 422, and the tensile stress insulation layer 421 is selected among the five materials, and thus the combination has 125 different possible patterns.

Furthermore, when the tensile stress insulation layers 411 and 421 and the compressive stress insulation layers 412 and 422 are alternatively stacked as in Itoh, the tensile stress insulation layers 411 and 421 are generally made of the same insulation material and the compressive stress insulation layers 412 and 422 are also generally made of the same insulation material. Therefore, it is not necessary for Itoh to use different insulation materials for the compressive stress insulation layers 412 and 422. Thus, Itoh cannot easily lead to the present

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invention including the insulation film having impurities, the silicon oxide film and the silicon nitride film.

As anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Itoh does not disclose the claim elements noted above, it is clear that Itoh does not anticipate either of claims 34 and 43, or any claim dependent thereon.

III. The Rejection Of Claims 34-36 And 38-45 Under 35 U.S.C. § 102 Over Mayumi

Claims 34-36 and 38-45 were rejected under 35 U.S.C. § 102(b) as being anticipated by Mayumi et al. (JP 61287151). Applicants respectfully traverse these rejections for at least the following reasons.

As indicated above, claim 34 discloses in-part, a semiconductor device comprising: a substrate having a semiconductor region; an insulating film formed over said semiconductor region, said insulating film including impurities and having a property of reflowing due to a heat treatment under predetermined conditions; an interconnection disposed on and in contact with a first region of an upper surface of said insulating film; a silicon oxide film in contact with a second region of said upper surface of said insulating film, **said silicon oxide film having a property of not reflowing due to said heat treatment under said predetermined conditions.** Claim 43 is similar to claim 34 except that it substitutes the term "phosphorus" in place of the term "impurities".

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In contrast to the claimed invention, Mayumi discloses a PSG film 4 that corresponds to the silicon oxide film of the present invention. However, PSG has a property of reflowing due to the heat treatment under the predetermined condition whereas the silicon oxide film of the present invention has a property of not reflowing due to the heat treatment under the predetermined condition. Therefore, the silicon oxide film of the present invention is distinguished from the PSG film 4 of Mayumi.

As anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Mayumi does not disclose said silicon oxide film having a property of not reflowing due to said heat treatment under said predetermined conditions, it is clear that Mayumi does not anticipate either of claims 34 and 43, or any claim dependent thereon.

IV. The Rejection Of Claims 34-43 And 48 Under 35 U.S.C. § 102 Over Ueda

Claims 34-43 and 48 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ueda et al. (U.S. 5,545,919). Applicants respectfully traverse these rejections for at least the following reasons.

As the elements disclosed in Ueda utilized in the rejection of claims 34 and 43 are identical to the elements disclosed in Mayumi, Applicants refer the Examiner to the argument disclosed above in defense of claims 34 and 43. Accordingly, Applicants respectfully submit that Ueda does not anticipate claims 34 and 43, or any claim dependent thereon.

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V. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 34 and 43 are patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

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I HEREBY CERTIFY THAT THIS PAPER IS BEING
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